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# SCIENCE NEWS LETTER

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THE WEEKLY SUMMARY OF CURRENT SCIENCE • OCTOBER 28, 1944

## Into The Sun

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A SCIENCE SERVICE PUBLICATION

ENGINEERING

# Transcontinental Network

**About 7,000 miles of coaxial cables will link the east and west for improved telephone and possibly future television service.**

➤ ABOUT 7,000 miles of coaxial cables will form a coaxial cable network stretching from Boston to Los Angeles to be used to carry up to 480 different telephone channels simultaneously, as well as television pictures, after the war, Harold S. Osborne, chief engineer of the American Telephone and Telegraph Company, told the meeting of the Society of Motion Picture Engineers in New York.

The laying of the coaxial cables underground is already in progress between Terre Haute, Ind., and St. Louis, Mo., but it will probably take about five years to complete the transcontinental network, he stated.

The proposed network will operate on a cable running from Boston to Atlanta, Ga., thence across the country to Los Angeles and the west coast. At New Orleans, a branch route will run north to St. Louis and Chicago, Mr. Osborne announced.

"While the coaxial cable system has been in service in this country for several years, its application up to the present has been narrowly limited," he pointed out.

At present there is only one coaxial cable link between New York and Philadelphia that has been used to transmit television pictures, as well as up to 800 long-distance telephone conversations at the same time.

The coaxial cable consists of a metallic conductor held in the center of a cylindrical metallic sheath by insulators. The atmosphere around the conductor can be of normal pressure, a partial vacuum under pressure, or partially gaseous, depending upon the use to which the cable is to be put.

Coaxial cable networks are elaborate and expensive to build and maintain. While Mr. Osborne gives no estimate of the cost of the network, it has been estimated that a single coaxial cable from New York to Hollywood would cost about $20,000,000.

Completion of the network will speed the day when a nation-wide network of television stations will make available, to urban as well as rural communities the modern wonder of "pictures through the air."

*Science News Letter, October 28, 1944*

OPTICS

# Optical Gunsight

**Rockets fired from bazookas are more likely to hit their targets and three-dimensional pictures are nearer to being perfected, thanks to this new gunsight.**

➤ ROCKETS fired from bazookas are more likely to hit their targets and three-dimensional pictures are nearer to being perfected, thanks to a new optical gunsight for bazookas. The design of the gunsight was made possible through the use of a system of mathematical calculation for optics developed by Dr. Robert Clark Jones, now associated with the Bell Telephone Laboratories, Murray Hill, N. J.

In recognition of this mathematical system, which advances the theoretical understanding of complicated parts of optical systems, 28-year-old Dr. Jones received the Adolph Lomb medal, awarded every two years for outstanding accomplishment in the field of optics by the Optical Society of America, at its meeting in New York.

The new system for calculating optical systems is reported by Dr. Jones to be two to three times faster than other methods for securing the necessary information needed for the design of gunsights, periscopes, microscopes and other complicated optical systems, because it eliminates most of the time-consuming algebraic figuring heretofore required. Instead of going through lengthy equations, and solving many complicated mathematical problems, the Jones system employs a set of theorems, or general mathematical statements. When used with geometric drawings of the optical units involved and the mathematics of calculus, it enables the optical designer to rapidly predict on paper just how his instrument is going to work before it is built. Not only is the speed with which the result is gained increased, but since there are fewer steps to the process, the chance of a trained worker making an error is greatly reduced. It will also make it possible to perform certain calculations which could not be done before by any convenient method.

One of the primary uses of the Jones system is the solving of problems involving polarizers, crystals used to convert ordinary light into light that has different properties in different directions (polarized light). In this field it is being used to perfect three-dimensional pictures. The system was developed by Dr. Jones while employed by the Polaroid Corporation.

While the Jones system is of greatest value to physicists and chemists, it is so simple that it can be built into an automatic calculating machine for use by less-skilled workers in research laboratories.

In recent years, Dr. Jones collaborated in the development of sirens for air-raid warning, and signalling. One of these sirens is atop the Empire State Building in New York City.

*Science News Letter, October 28, 1944*

MILITARY SCIENCE

## Foot Soldiers Get Airborne Rocket Launcher

➤ THE ARMY'S newest lethal weapon, designed for use against heavy gun emplacements, looks like a four-foot length of stove pipe mounted on a three-leg tripod, like amateur cameramen used in making pictures.

Actually, it's just one of the tubes from the three-tube rocket launchers now mounted under the wings of warplanes adapted for use on the ground.

Known officially as the M12, it is portable, weighing only 35 pounds when loaded, and it can be carried, set up, and fired by one man. The tube is one foot shorter than the standard bazooka which is fired from the shoulder.

Tube and tripod are set in position a short distance from the target, the rocketier slides in the 45-inch projectile, strings wire from the launcher to the remote control "trigger," and launches the rocket, which packs a terrific wallop.

*Science News Letter, October 28, 1944*

ELECTRONICS

# Projection Television

**When you go to the movies some day in the future, you may see the news as it happens instead of a news reel which pictures news several days old.**

➤ MOTION picture engineers gathered at the fall meeting of the Society of Motion Picture Engineers. The significant thing about the meeting as a whole was that these experts, who carry the burden of recording on film every thing you see and hear at a movie theater, showed remarkable interest in problems which the average person might think divorced from their primary field.

Many of the more than 20 reports presented dealt with such subjects as television, printing, airplane vibration analysis, in addition to reports on new cameras, films, and theater projection problems.

One day in the future you may see the news as it happens instead of a news reel, which pictures news several days old, when you go to a movie theater. Television pictures large enough to be viewed by theater audiences and larger television pictures for home viewing were discussed by D. W. Epstein and I. G. Maloff, of the Radio Corporation of America.

These larger pictures are made possible by producing a small and very brilliant television picture and projecting the picture through a lens onto an ordinary movie screen.

The authors stated that the cathode-ray tube which is used in every modern television receiver to pick up pictures has been found to be the most practical means of originating the television pictures for projection. The problem of providing a cathode-ray tube capable of producing very bright pictures has been solved largely by the development of high-voltage cathode-ray tubes, they revealed.

Reflective optical systems, the authors stated, are to date the most effective for picking up the largest possible amount of light from the pictures on the cathode-ray tube. This system consists of a spherical mirror which reflects the image from the cathode-ray tube to an aspherical lens, through which it is projected on the screen. Television pictures ranging from 25 inches to 25 feet across diagonally have been developed, they declared.

The handicap of this optical projection system, for use in a home projection receiver, has been the high cost of the aspherical lens. The development of a process for molding aspherical lenses from plastics overcomes this problem.

Present television receivers, with 10-by-10-inch cathode-ray screens, need no optical projection system, as they are large enough for viewing at close range in the living room by three or four people. Where the audience is larger, television pictures two feet high can be projected like home movies, for viewing at a distance of about 10 feet.

*Science News Letter, October 28, 1944*

## Reflex Camera for Movies

➤ A NEW 35 millimeter reflex camera for taking motion pictures, permitting the camera man to view exactly what he is taking, was described to the meeting by Art Reeves, of Hollywood, Calif. The camera finder or viewer is attached to the lens system of the camera, so that the cameraman views the subject being photographed through the same lens that is taking the picture.

Designed for military and commercial production purposes, Mr. Reeves stated that the camera is lightweight, compact, and motor driven. The reflex principle has been used for many years in still cameras.

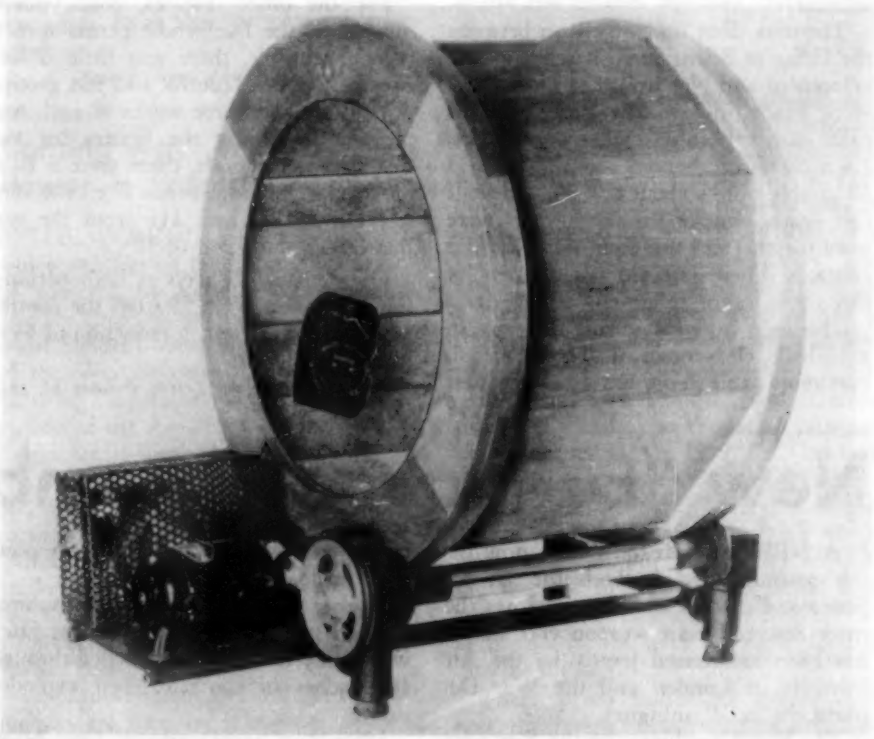
*Science News Letter, October 28, 1944*

## 8,000 Pictures a Second

➤ THE SUCCESSFUL design of a high-speed motion picture camera that is capable of taking up to 8,000 pictures a second was revealed at the meeting by H. J. Smith, of Bell Telephone Laboratories, Inc. The pictures taken are 8 millimeter size taken on 16 millimeter films and can be viewed with any standard 8 millimeter projector.

The camera will probably be used to make ultra-slow motion pictures that stop the action of such fast moving subjects as airplane propellers, gas turbines, and so on, for technical analysis.

*Science News Letter, October 28, 1944*



***ROUGH HANDLING**—To guard against possible damage from rough handling, exposure meters must be built to stand the effect of being placed in this tumbling barrel, revolving at 60 rpm, for one minute. American Standards Association photograph.*

PUBLIC HEALTH

# Mumps Epidemic Checked

**Glycol vapor air sterilization for air-borne diseases is now more than just a hope based on laboratory experiments. It has become a practical method.**

➤ CHECKING the spread of colds and other air-borne diseases by sterilizing the air of living quarters with an invisible, odorless, non-irritating inexpensive vapor of triethylene glycol is now more than a hope based on laboratory experiments. It has become a practical method of disease-fighting that passed rigorous tests in a military camp as reported by Dr. Edward Bigg, Prof. B. H. Jennings and F. C. W. Olson, of Northwestern University, at the meeting of the American Public Health Association in New York.

Specifically, it reduced the total bacterial air contamination; practically eliminated hemolytic streptococci from the air of glycol-treated dormitories; definitely reduced cases of air-borne infections, such as colds, tonsillitis, pneumonia, measles and acute sinusitis; controlled a small epidemic of mumps; prevented the spread of hemolytic streptococci from the throat of one person to another.

The tests, done under contract between the Office of Scientific Research and Development and Northwestern University, were made in two two-story barracks each divided into eight dormitories. Each dormitory housed about 80 men in 40 double bunks about one and one-half feet apart. Four of the dormitories were used for the test and four were kept as controls. These last did not get any of the glycol vapor treatment of the air.

The men mingled during the day in mess-halls, class-rooms, drill-halls, recreation rooms and so on, but as the greatest degree of air contamination and of cross infection is believed to occur in sleeping quarters, it was decided to treat only these for the test.

The test was divided into three periods, since every six weeks a new group of men replaced the previous group in the dormitories. Altogether there were 1,000 in the test group and 1,000 in the control group.

During the small mumps epidemic there were about the same number of cases developing in the control barracks as in the test barracks during the first three weeks, which is the incubation period of this disease. After that period there were only four more cases from the test barracks while 14 cases occurred in the control barracks that had no glycol vapor. The men who developed the disease during the first three weeks acquired the infection before coming under observation in the test.

For the other diseases, colds, pneumonia and the like whose germs spread through the air, there was little difference between the control and test groups during the first three weeks of each test period. Combining the figures for the first two test periods, there were a total of 126 hospital admissions from the control dormitories and 111 from the test quarters, a reduction of 12%.

For the final 17 days of both periods, however, there were 53 from the control and 19 from the test, a reduction of 64% in cases of illness.

*Science News Letter, October 28, 1944*

MILITARY SCIENCE

# New "Earthquake" Bomb

➤ A NEW type six-ton bomb, now being manufactured in both the United States and Britain and described as "the most destructive air weapon ever used," has been announced jointly by the Air Ministry in London and the War Department in Washington.

The bomb combines for the first time a tremendous penetrating power with a very destructive blast. Already in use for several months, the bomb drills its way deep into its target, then sets off the heaviest possible charge of very powerful explosive.

During attacks on the Nazi submarine pens at Brest, the new bombs fitted with delayed action fuses drilled through 144 inches of concrete, then exploded inside.

Limestone caves, where the Nazis stored flying bombs at St. Leu Desserant, were completely collapsed by the bombs, just as though they had been undermined by a violent earthquake.

The remarkable blast effect of the new 12,000-pound bombs were demonstrated during the bombing of a long-range weapon emplacement at Wizerne. The target was a quarry at the end of which was a cliff that contained passages and cavities used for storing supplies. For protection, the Nazis built a dome-like concrete structure on top of the cliff. One of the new bombs was dropped so that it landed either in the quarry or near to the cliff, causing the whole cliff to drop into the quarry.

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METALLURGY

# New Research Field

**"Fractography," the study at high magnification of the structure of fractures in metals, may enable metallurgists to enter a little-known field of science.**

➤ FIRST facts about "fractography," a new technique that may enable metallurgists to enter a virtually unexplored field of science, the study at high magnification of the structure of fractures in metals, were revealed by Carl A. Zapffe and Mason Clogg, Jr., of the Rustless Iron and Steel Corporation, Baltimore, at the meeting of the American Society for Metals.

Fractography, a word coined by the authors, is defined as, "the micrographic study of cleavage facets on fractured metal specimens."

Cleavage facets are minute flat surfaces which make up the cleavage plane along which the fracture takes place. Cleavage planes, several sets of parallel planes, are present in pure metals, such as iron, and in rocks. When iron is broken, the fracture or splitting usually takes place along the cleavage planes.

Imagine slicing a wooden block horizontally and vertically to form smaller cubes, then cutting the small cubes up into still smaller cubes, and so on indefinitely. The slicing or cutting planes correspond to cleavage planes.

To date, the authors pointed out, all the known information about fractures is based upon observations made with the naked eye or low-power microscopes. The fracture of a metal, which causes it to break down, holds much information for the metallurgist. Brittle fractures, fractures caused by fatigue, corrosion, and other types of failure, all have their own individual characteristics and stories to tell.

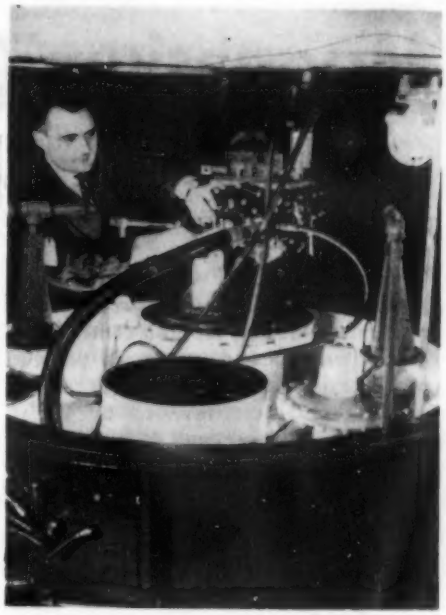
The technique of fractography, as described by the authors, requires three operations. First, the specimen of metal to be examined is fractured by impact or some other means. A mere chip of metal is satisfactory for fractographic examination. Next, one of the individual facets is selected for examination with the aid of a magnifying glass. The specimen is mounted in between clamps with the facet to be studied at right angles to the axis of the microscope on a simple orienting mechanism which is fitted onto the stage of the microscope. Finally, any raised spots on the surface of the specimen which interfere with bringing the objective lens of the microscope into contact with the metal specimen are removed with an electric hand-grinder.

"Probably a principal use of fractography will develop around expanding our information on known structures (by observing them under new conditions)," they stated.

General advantages of fractography as reviewed by the authors include: the fact that odd sizes, shapes, and tiny fragments unsuited to regular examination may be studied; saving of time by avoiding mounting, polishing and etching before examination; the plane of weakness, which is often of greatest interest in studying the failure of metals, is the plane which is observed; observation of structures new to science, which cannot be studied with other present day methods; seeing the specimen in its natural state, disclosing true structure without the effects of polishing and etching.

Through use of fractography, metallurgists may be able to explain why metals with certain types of fracture structures have definite physical properties.

*Science News Letter, October 28, 1944*



***CARBURETORS TESTED**—Under simulated flying conditions, this device tests carburetors for Wright Cyclone airplane engines. The hood of the airbox is raised here, with carburetor in place and air and fuel lines attached; when fastened shut, atmospheric conditions at various altitudes can be accurately reproduced. Protecting the tricky operation from fire is the job of the "witches' hats," seen at either side.*

ENGINEERING

## Coming Age of Rocket Power Is Predicted

➤ THE COMING age of rockets, in which vehicles on land, sea, and air will be powered by rockets, jet propulsion, and gas turbines was pictured by G. Edward Pendray, assistant to the president of the Westinghouse Electric & Manufacturing Co., at a meeting of the Potomac section of the American Society of Tool Engineers in Washington.

Large, fast, high-flying airplanes propelled by jets and rockets, long range rockets that will break into the stratosphere to record weather information, and mail-carrying rockets will be common in the future, stated Mr. Pendray, who is a founder and secretary of the American Rocket Society.

Jet propulsion engines and gas turbines such as are used on warplanes and the Nazi "buzz-bombs" are just as much true rockets as the bazooka projectile, or the airborne rockets, he pointed out.

Five forms of rocket power will eventually come into widespread civilian and peacetime use, Mr. Pendray commented. These include dry fuel, liquid fuel, thermal-jet engine, and two forms of duct engines, intermittent and continuous. The dry and liquid fuels are used today for giving power to rocket projectiles. The remaining three are used primarily on aircraft. The intermittent duct engine is the type which the Nazis used on the famous "buzz" bombs, he stated.

Dr. Robert H. Goddard was referred to by Mr. Pendray as the father of modern rocket science. In 1919, Dr. Goddard published a paper, "A Method of Reaching Extreme Altitudes," which laid the foundation for most of the research which has resulted in our present-day rockets. He was the first to build a liquid fuel rocket, and has continued to conduct experiments in the field for more than a quarter century.

There is no immediate prospect of rockets carrying human cargoes, although rocket-assisted planes may attain speeds approaching 1,500 miles an hour, Mr. Pendray reported.

*Science News Letter, October 28, 1944*

METALLURGY

# Magnesium Alloys Improve

**Improvement in the resistance of this metal to destructive corrosion, by reducing the iron content, has resulted in renewed interest in its possible applications.**

➤ IMPROVEMENT in the resistance of magnesium alloys to destructive corrosion, by reducing the iron content, has resulted in renewed interest in possible applications of the lightweight alloy. These facts were revealed by P. T. Stroup, G. F. Sager, and J. B. West, of the Aluminum Company of America, New Kensington, Pa., at the meeting of the American Society for Metals, held in Cleveland.

While sheets of magnesium alloy cost more per pound than sheets of other commercial structural metals, the light weight of the alloy makes it possible to fabricate more articles per pound from magnesium than from other metals. As an illustration, the authors stated that four times as many objects can be made from magnesium sheet as from steel sheet, and 1.5 times the number from aluminum sheet.

The resistance to corrosion of magnesium alloys is greatly underrated because of the poor behavior of the metal in the early days of its use, the authors commented. The inherent resistance of magnesium to corrosion has been greatly improved by extensive studies on the effect of metallic impurities such as iron, nickel, cobalt, copper and chromium on the corrosion resistance of magnesium. A decrease in iron content of magesium alloys resulted in improved resistance to corrosion..

Since corrosion reduces the tensile strength of metals, the more corrosion-resistant magnesium sheet has such characteristics as "outstanding machinability," "excellent welding characteristics," and it is "resistant to alkalis and fluorides," the authors reported.

The spreading of liquids over the surface of solids is important in many engineering fields. In metallurgy, this phenomenon is interesting because of problems which arise in the brazing and coating processes. For example, it is difficult to get liquid silver to flow over a smooth clean surface of iron.

Ways by which liquid metals may be caused to spread very readily on metallic surfaces were revealed to the meeting by E. R. Parker, of the University of California at Berkeley, and Roman Smoluchowski, of the Research Laboratory, General Electric Company, Schenectady, N. Y.

The behavior of a liquid on a solid metallic surface depends upon the condition of that surface, the authors stated. Liquid metal, they pointed out, spreads best on finely ground, or on polished and etched surfaces, both of which have fine capillary structure. It does not spread on polished surfaces under the same conditions.

*Science News Letter, October 28, 1944*

INVENTIONS

## Reduction in Inventions And Research Due to War

➤ THE FACT that thousands of scientists and engineers who are normally engaged in peacetime research are now in military service or devoted to war problems has resulted in a marked reduction in fundamental research and invention, R. J. Dearborn, president of the Texaco Development Corporation and chairman of the National Association of Manufacturers committee on patents, concludes in a report recently made public.

War stimulates the application of accumulated knowledge rather than the pioneering on the frontiers of science and technology, he pointed out. Not since the first ten years of the 20th century has the number of applications for patents, and the total of patents granted, fallen to the low point of today's record. Only 14,000 patents were issued during the first six months of this year. During the same period in 1939, about 21,000 patents were issued.

"We are burning up America's backlog of scientific knowledge during the war just as we are using up our natural resources," Mr. Dearborn declared.

To prevent a decline in the normal rate of scientific and technological progress, he stated that incentive must be provided for research and invention. A strong patent system, Mr. Dearborn urged, will stimulate and encourage inventors and research workers to produce new ideas that can be transformed into useful products. This would provide, in his opinion, the incentive necessary to regain this lost scientific momentum.

*Science News Letter, October 28, 1944*

*CHAIN SAW—Powered by a motor similar to the type used to propel outboard motor boats, the chain saw weighs about 100 pounds, and is so well balanced that it can be operated in any position. All operations are controlled by the operator on the left.*

***G. I. MULE—He is carrying a chain saw which will cut through a tree or hard wood log 12 inches thick in twelve seconds. Photographs by Fremont Davis, Science Service Staff photographer.***

MEDICINE

# Mid-Life Change in Men

**Condition relatively rare, can be treated satisfactorily with the appropriate sex hormone. Psychoneurotic conditions are not benefited by the treatment.**

➤ A GLANDULAR change in mid-life, such as invariably occurs in women, does also occur in men and, as in women, can be treated satisfactorily with the appropriate sex hormone, Dr. Carl G. Heller, of Vancouver, Wash., and Dr. Gordon B. Myers, of Detroit, report (*Journal, American Medical Association*, Oct. 21).

The change, scientifically termed the climacteric, is relatively rare in men, however. It may occur as early as the third decade of life, but probably only a small proportion of men who live into old age are affected.

Sometimes the nervousness, psychic depression, inability to concentrate, hot flashes and other symptoms that characterize the climacteric in men are due not to glandular failure but to a psychoneurotic condition. Such cases are not benefited by sex hormone treatment. This fact gives physicians one way of distinguishing between the two conditions. The diagnosis may also be made by laboratory tests.

The laboratory tests gave Dr. Heller and Dr. Myers objective evidence that 23 of 38 patients complaining of the physical and psychic symptoms of the climacteric owed their symptoms to sex gland failure. Disappearance of the symptoms following treatment with the male sex hormone confirmed the evidence of the laboratory tests.

The hormone is given by hypodermic injection three times a week, or by implantation of pellets of the hormone under the skin in the thighs. Such a hormone bank will be effective for six to 10 months. Doses of the hormone by mouth were not successful.

The hormone treatment is not advised for patients with cancer or any suspicion of cancer, for those having any dropsy, or for any patient showing normal sex gland function. In this connection the two doctors warn that "ill advised treatment with testosterone (male sex hormone) may cause permanent sterility."

*Science News Letter, October 28, 1944*

PUBLIC HEALTH

## Unwarranted Fears Of Malaria Are Debunked

➤ SO MUCH has been said and written about the dangers of malaria to our troops fighting around the world and to civilians when the troops return that many persons may have developed unwarranted fears on the subject.

Malaria is and has been for some 2,500 years the "most serious disease in the world," students of this plague believe. It is held responsible for some 3,000,000 deaths among 300,000,000 victims a year. In the chronic form which develops in natives of highly malarious regions it has persistent incapacitating effects.

However, you need not worry about such effects in that serviceman of yours who has been exposed to or perhaps attacked by malaria.

"The fear that malaria, once acquired lasts for life, is unfounded," the Preventive Medicine Division of the Office of the Surgeon General, U. S. Army, points out in a statement on malaria.

Vivax malaria, which is the most common type, very rarely persists for more than one to two years, and three years is the maximum time, when the disease is properly treated, Lieut. Col. Francis R. Dieuaide, Medical Corps, Chief of the Tropical Disease Treatment Branch of the Medicine Division, said. There also is no evidence to support the fear that the disease leaves any permanent damage in its victims.

Named after the species of malaria parasite which causes the benign tertian form of the disease, vivax malaria rarely causes death. Its attacks of chills and fever occur every other day.

The malignant form of the disease is known as falciparum malaria. Atabrine, a synthetic substitute for quinine, has been found to be a cure for a high percentage of the cases of this form of malaria.

Discussing the Army's experience with vivax malaria, Col. Dieuaide said that "patients have usually had fever for only two or three days. Persistent incapacitating effects of chronic malaria, such as are often seen in natives of highly malarious regions, have rarely developed."

*Science News Letter, October 28, 1944*

The deepest hole in the world is a Texas *oil well* recently drilled to a depth of 15,279 feet, nearly three miles; it is 20 inches in diameter at the surface and tapers to less than eight inches at the bottom.

METALLURGY

## New High-Speed Process Coats Wire with Tin

➤ A NEW high-speed process for depositing a tin coating of any desired thickness on any gauge of electric wire is being exhibited in Cleveland at the National Metals Congress by E. I. du Pont de Nemours & Co.

Copper wire used in the electrical industry has to be coated with tin for protection before the insulating rubber is put on. Until now, a common practice has been to dip the wire in molten tin. The heat from the molten tin causes the copper wire itself to become soft as it picks up the tin, forming a copper-tin alloy on the wire, which increases its electrical resistivity.

The new electrolytic process deposits tin on the wire without producing an alloy, and therefore does not affect resistivity. The process requires only half as much tin as the older methods.

Central unit of the new process is a special wire-plating machine, 30 feet long. It was designed and constructed by the National-Standard Company of Niles, Mich. The apparatus is arranged so that there is a minimum of tension and drag on the wire. The wire zips in and out of as many as seven baths of cleaning and plating solutions. Between baths, excess fluid of the wire is "wiped" off by blasts of compressed air.

Wire only five thousandths of an inch thick can be coated at the rate of 800 feet a minute, without breakage. Heavier strands of wire can go through at even higher speeds.

*Science News Letter, October 28, 1944*

MILITARY SCIENCE

## Tough Searchlight Is Developed for Warships

➤ A SIGNALING searchlight for American warships, tough enough to withstand the pounding of heavy ocean waves and the shock of big guns fired close by, has been developed and tested in the laboratories of the Westinghouse Electric & Manufacturing Co., and is now ready for duty.

A special glass, ten times stronger than plate glass, is used for the lens; it not only stands the severe shocks of the waves and the firing guns, but resists sudden changes of temperature. This glass can be heated to a very high temperature and then plunged into icy water without showing the slightest strain, it is claimed.

The searchlight flashes its message in code by projecting a beam of light through a series of Venetian-blind shutters opened and closed by hand to simulate dots and dashes. It sends out a light beam visible on a clear night for many miles. The shutters are designed to take severe punishment without interference with their operation.

*Science News Letter, October 28, 1944*

NUTRITION

## Potatoes Converted into Paste for Making Jelly

➤ A FAIRLY simple method of converting potatoes into a sugary paste for use in making jelly and candy has been evolved by Professors Davidov, Voitkevich and Maisuryan of the Lenin Academy of Agricultural Science, in Moscow. Either fresh or frozen tubers may be used in making the jelly-like substance. Not only the starch, but also the protein and mineral salts contained in potatoes can be used in this new method, according to the U.S.S.R. Central Food Institute. From 2% to 5% powdered malt from barley, rye or wheat is added to the hot mashed potatoes. This transforms the starch into glucose.

The resulting sweet, creamy substance is steamed until it evaporates into a dark brown paste. One pound of paste can be made from two and a half pounds of potatoes. Nearly half of the paste consists of sugars which preserve all the valuable protein and other nutritive elements of potatoes.

*Science News Letter, October 28, 1944*

ELECTRICITY

## Tough Nylon Compound Coats Electric Wire

➤ A NEW nylon compound coating on electric wire gives unusual protection because it is tough, resistant to abrasion and heat, and impervious to attack by practically all solvents. Ignited by a free flame, the nylon coating ceases to burn when the flame is removed, and is therefore self-extinguishing. The new coating is a development of E. I. du Pont de Nemours and Company.

The coating is applied by an extruding process and wire can be coated at rates of over 1,000 feet per minute. It is laid snugly over the wire at an even thickness, which is determined by the wire speed as it passes through the plastic. The new compound may be found usable as a sealing material to fill the interstices between individual wires.

*Science News Letter, October 28, 1944*

# IN SCIEN

PALEONTOLOGY

## Mastodon Bones Found In Drainage Ditch

➤ BONES of a mastodon, primitive Ice Age elephant, have been found protruding from the bank of a drainage ditch on the farm of Carl Work, about 12 miles from Wooster, Ohio. Discovery is announced by Prof. Karl Ver Steeg of the College of Wooster (*Science*, Oct. 20).

The skeleton when found was incomplete, with the bones of the rear part of the body missing. They had apparently either been carried off by the excavating machine when the ditch was dug, or had been subsequently lost through erosion of the bank. The skull and tusks are in good condition. The tusks, which are complete, are three feet long and four inches in diameter at the base. The animal was small, as mastodons go.

The mucky nature of the soil in which the bones were embedded suggests that the area was a Pleistocene swamp, in which the luckless beast became mired and died.

*Science News Letter, October 28, 1944*

OCEANOGRAPHY

## Scottish Research Body Studies Seaweeds

➤ SEAWEED beds that fringe Scotland's rocky coasts will be more intensively studied, with an eye to their greater economic exploitation, by the newly formed Scottish Seaweed Research Association. Its organization, in cooperation with the British Ministry of Supply and the Scottish Council of Industry, is announced in the United States in *Science* (Oct. 20).

A research ship, the Prospecto, has been especially equipped for collecting and investigating seaweed species growing in deep water. Other researches will be conducted from shore stations.

Seaweed has been used locally for many years as an agricultural fertilizer, either directly or after burning. To some extent it has also been fed to livestock. More modernly, chemical industries have utilized it as a source of iodine, potash, adhesives and other products. Greater efficiency in these industries, as well as new uses, are the objectives.

*Science News Letter, October 28, 1944*

# E FIELDS

MEDICINE

## Transparent Film for Use On Oxygen Tent Canopies

➤ TRANSPARENT film is now being used in place of conventional heavy rubberized fabric for the canopy of oxygen tents. These tents are used in the treatment of pneumonia, heart disease, post-operative and similar cases where air conditioning and oxygen therapy are combined. With the air conditioning feature alone, the tents are used for cases involving carbon monoxide poisoning, heat prostration, asthma, for sufferers from hayfever and other ailments caused by pollen.

Developed by cooperative research involving the Continental Hospital Service, Cleveland, and the Goodyear Rubber Company, producers of the transparent film known commercially as Pliofilm, the new oxygen tents have distinct advantages over old-type rubberized tents.

Since the film is transparent, it is possible to keep patients under constant observation. The tent canopies can be discarded after use, thus eliminating the danger that a new patient may become infected from a previously-used canopy. Discarding the canopies saves valuable man-hours needed formerly for cleaning and sterilizing the canopies after each use.

*Science News Letter, October 28, 1944*

PLANT PATHOLOGY

## Crown Gall of Plants Cured by Penicillin

➤ CROWN gall, a disfiguring and destructive disease of plants that is often called plant cancer, has been cured with penicillin in the plant pathology laboratories of the University of Arizona, Prof. J. G. Brown, head of the department, recently announced.

Crown gall is caused by a bacterial species, differing in this respect from human and animal cancers which it resembles in many other ways. So far as known, human and animal cancers are never directly produced by bacterial attack.

Regardless of whether or not Prof. Brown's discovery proves to have significance in the fight on human cancer, it promises practical results in the immediate field of plant pathology, if it leads to a practical treatment of crown gall in the field. This disease is known to attack at least 100 kinds of plants, and is an especially destructive enemy of young shrubs and trees in nurseries and orchards.

The crude penicillin extract used in Prof. Brown's experiments successfully cured the soft type of crown gall. It cost two cents per quart, and a quart was sufficient to destroy many small galls.

Last spring, Prof. Brown and Miss Alice M. Boyle announced the first known successful penicillin attack on a bacterial species causing a plant disease. Under laboratory conditions, they used the drug in killing the germ of the destructive rot that has been decimating the picturesque giant cactus, or sahuaro, in the Southwest.

*Science News Letter, October 28, 1944*

INVENTION

## Trenching Machine Cuts With Screw, in New Patent

➤ A DEVICE as old as Archimedes (d. 212 B.C.) is put to the modern use of digging trenches for pipe lines in the invention covered by patent 2,360,334, issued to F. A. Engel of Roselle, N. J., and D. J. Manning, Mountainside, N. J., and assigned by them to the Elizabeth Products Corporation.

Archimedes, it will be recalled, lifted water out of a ship's hold by means of a long helical screw enclosed in a tube. In the new adaptation a similar screw, with a sharp cutting edge, is drawn slowly through the soil at an angle, power-turned as it moves along. Its exposed side is covered with a metal half-cylinder, to guide the loosened soil to the surface, where it is carried out of the way by a suitable conveyor.

*Science News Letter, October 28, 1944*

AERONAUTICS

## Navy Warbird Speeds Into Path of The Setting Sun

**See Front Cover**

➤ SYMBOLIZING the part that U. S. aircraft carriers are playing in hastening the descent of Japan's Rising Sun, this carrier sends a huge craft into the path of the setting sun somewhere in the Pacific. Silhouetted barrels of five-inch guns command the sky over the flat-top. Elsewhere, thousands of other planes are heading into the sky to hasten the day of final victory.

*Science News Letter, October 28, 1944*

STATISTICS

## Peoples Moving to America Gained Longer Lives

➤ PEOPLES of many lands moving to America found they gained not only a better life but also a longer one. Mortality among the foreign born today is no greater than among the native born, who have a life expectancy greater than that of any other peoples.

People born in foreign lands at the turn of the century died, on the average, much sooner than those born on American soil, the death rate being about one-fifth higher, according to statisticians of the Metropolitan Life Insurance Co. Living in crowded and unhealthful tenements, ignorance of modern sanitary principles and working under sweatshop conditions were largely responsible. But as the foreign born were educated to the democratic way of life, their health handicaps diminished, until by 1940 the death rates for the two groups were about equal.

"In these four decades, the foreign born, having the greater room for improvement, have also made the more rapid decrease in mortality, their death rates having been reduced by almost one-half, while the native born experienced a reduction of two-fifths," the company reports.

*Science News Letter, October 28, 1944*

INVENTION

## Warlike Inventions Are Still Outstanding

➤ AS THE war goes on, so do warlike inventions. An outstanding one in this class is a self-lubricated driving band for artillery projectiles, on which patent 2,360,473 was granted to W. G. Calkins of Detroit, assignor to the Chrysler Corporation. In place of the solid ring of soft copper conventionally used, it consists of a ring of sintered copper alloy impregnated with graphite and other lubricating materials, the whole being bonded to a backing ring of steel which secures it to the shell.

An aerial bomb made of porcelain is the somewhat Chinese-sounding proposal advanced by James D. Long of Laurel, Md., in obtaining patent 2,360,696. The idea is to conserve metal, and at the same time obtain an effective, low-cost fragmentation missile. Shrapnel pellets (which may also be made of porcelain) are optional inclusions within the explosive charge.

*Science News Letter, October 28, 1944*

ASTRONOMY

# Orion, Prelude to Winter

**The giant warrior is on his back, for the three stars in a row that form his belt are in a vertical line. Saturn is also visible on November evenings.**

By JAMES STOKLEY

➤ ORION comes back to our maps this month, and with its reappearance we realize that winter is not far away. At the hours for which these maps are drawn (11:00 p.m. on Nov. 1, and an hour earlier at the middle of the month), this group can be seen low in the east. The giant warrior is on his back, for the three stars in a row that form his belt are in a vertical line. To the north of these is Betelgeuse, in one shoulder, and to the south is Rigel, in a leg. Above him is Taurus, the bull, with brilliant Aldebaran.

The brightest object (next to the moon) in the November evening skies, however, does not appear on the maps. This is the planet Venus, which is still drawing away from the sun and remaining visible longer and longer after sunset. This month it sets about two hours after the sun, and until then can be seen shining brilliantly in the western sky. In the astronomer's scale, its magnitude is minus 3.5, which is about 25 times as brilliant as the average first magnitude star.

One planet does show on our maps. This is Saturn, in the constellation of Gemini, the twins, and just north of Betelgeuse. Of zero magnitude, it is about two and a half times as bright as a first magnitude star, so it can easily be found. It rises in the northeast about three hours after sunset.

### Brightest Star

Brightest of the stars visible these evenings is Vega, in Lyra, the lyre, a little group in the northwest just below the "northern cross," in Cygnus, the swan. At the top of the cross is another star of the first magnitude—Deneb. Lower, and directly west as shown on the maps, is Aquila, the eagle, with Altair shining within its boundaries.

Taurus, the bull, has already been located. To the left of this figure is Auriga, the charioteer, with Capella, second brightest of our stars of the November evening. Directly above this is the figure of Perseus, the champion, which contains no stars of the first magnitude. It does, however, have one very interesting object, the famous variable star Algol. To the left of Perseus, and directly above the pole star, is Cassiopeia, the queen, with the stars forming a letter M.

High in the south are the four stars that outline the "Great Square" of the constellation Pegasus, the winged horse. The upper left star, however, named Alpheratz, is not really part of Pegasus, but a member of the next-door group of Andromeda. She, in mythology, was the beautiful princess, daughter of Cassiopeia, who was chained to a rock until Perseus rescued her.

### Jupiter Appears

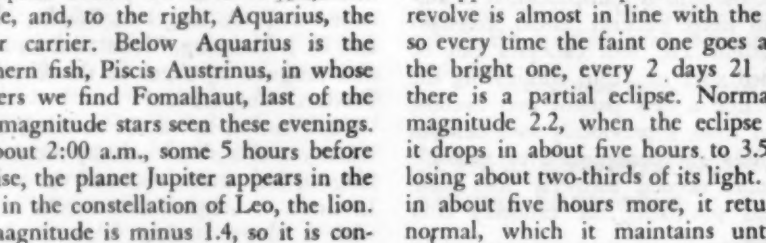
Below the square is part of Pisces, the fishes, through which the sun moves in April. Below Pisces is Cetus, the whale, and, to the right, Aquarius, the water carrier. Below Aquarius is the southern fish, Piscis Austrinus, in whose borders we find Fomalhaut, last of the first magnitude stars seen these evenings.

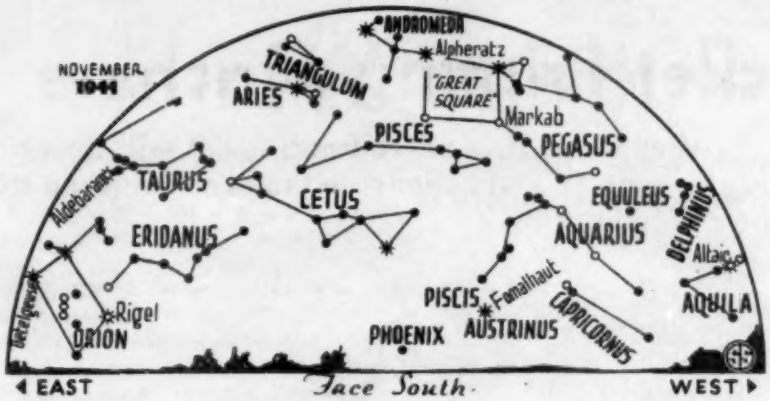
About 2:00 a.m., some 5 hours before sunrise, the planet Jupiter appears in the east, in the constellation of Leo, the lion. Its magnitude is minus 1.4, so it is considerably brighter than Saturn, for the smaller the magnitude number, the brighter the object. As for the other planets that may sometimes appear to the naked eye, Mars is not visible this month because it is in the same direction as the sun. Mercury is in the evening sky, but so nearly in the same direction as the sun that it cannot be seen.

Reference was made above to Algol, in the constellation of Perseus, and in the "Celestial Time Table" at the end of this article there will be found listed times for "Algol at minimum." Many stars in the sky change more or less regularly in brightness. With most, the variation is due to some physical cause which actually alters the amount of light that the star emits. But Algol, and a few others of the same type, known as "eclipsing variables," diminish in apparent brightness for the same reason that the sun is not as bright as usual during a solar eclipse. That is, something goes in front. In the case of the sun, that "something" is the moon, but for Algol it is a fainter star.

Algol, like a great number of stars (possibly even a majority), is double, consisting of two stars revolving around each other, and one member of the pair is about 16 times as bright as the other. It happens that the plane in which they revolve is almost in line with the earth, so every time the faint one goes around the bright one, every 2 days 21 hours, there is a partial eclipse. Normally of magnitude 2.2, when the eclipse starts it drops in about five hours to 3.5, thus losing about two-thirds of its light. Then, in about five hours more, it returns to normal, which it maintains until the next eclipse, two days later. The "Time Table" gives the times at which the minimum occurs in November during night hours. There are others, of course, during daylight, when the star is not visible.

Some 200 stars that vary in this way






are known, and they offer a wide variety of periods. For example, there is one such system in the constellation of the eagle, known as sigma Aquilae, in which the eclipse occurs every 1 day 23 hours. Auriga is rather well provided with them. Just below Capella, as shown on the maps (below the initial letter A), is the star beta Aurigae, which is eclipsed every 3 days 23 hours. In this case, the faint star barely comes in front of the bright one, and the change is only a tenth of a magnitude, from 2.1 to 2.2, not easily apparent to the naked eye.

In the same constellation, not far away from Capella, are also located the two with the longest known periods. One is zeta Aurigae, which drops from 4.9 to 5.6, a difference in brightness of more than twice, every 2 years and 8 months. A short distance north of this star is epsilon Aurigae, in which the eclipse occurs every 27 years! Here the drop is from 3.3 to 4.1, nearly the same ratio as for its neighbor.

### Celestial Time Table for November

| Nov. | EWT | |
|---|---|---|
| 1 | 11:20 p.m. | Algol at minimum |
| 4 | 8:08 p.m. | Algol at minimum |
| | 8:20 p.m. | Moon passes Saturn |
| 7 | 2:28 p.m. | Moon in last quarter |
| 10 | 1:31 p.m. | Moon passes Jupiter |
| | 11:00 p.m. | Moon farthest; distance 251,900 miles |
| 14 | 2:00 p.m. | Mars in line with sun |
| 15 | 6:29 p.m. | New moon |
| 16 | early a.m. | Meteors of Leonid shower visible in east |
| 18 | 9:40 p.m. | Moon passes Venus |
| 19 | 4:13 a.m. | Algol at minimum |
| 22 | 1:02 a.m. | Algol at minimum |
| 23 | 3:53 a.m. | Moon in first quarter |
| 24 | 9:51 p.m. | Algol at minimum |
| 26 | midnight | Moon nearest, distance 227,100 miles |
| 27 | 6:40 p.m. | Algol at minimum |
| 29 | 8:52 p.m. | Full moon |

Subtract one hour for CWT, two hours for MWT, and three for PWT.

*Science News Letter, October 28, 1944*

PSYCHOLOGY

# Air Medicine Triumphs

➤ THE PSYCHOLOGICAL testing program of the U. S. Army Air Forces has contributed directly to the number of bombs which hit in target areas of the U. S. Army Air Forces in Western Europe during this past year, Maj. Gen. David N. W. Grant, Air Surgeon, AAF, declared at the meeting of the Inter-State Post-graduate Medical Association of North America, held in Chicago.

A 90% reduction in the anoxia (oxygen lack) accident rate has been achieved in the Eighth Air Force during the past year as a result of the altitude training program of the AAF, Gen. Grant reported. The anoxia accident rate among Eighth Air Force heavy bomber crews has been reduced from 116 per 100,000 man-missions to 11.

These are two of five wartime achievements of aviation medicine. The other three Gen. Grant listed are: the flight surgeon's care of the flyer; the convalescent training program, and air evacuation of casualties.

The Army Air Forces have evacuated 426,000 sick and wounded men since September, 1942, Gen. Grant reported. Of these slightly over half, 53%, were U. S. Army ground forces, 30% were British and other allies, 6% were Navy and Marines and only 9% were AAF personnel.

The death rate in flight among these men, some of whom were in a critical condition, was only seven per 100,000 patient-trips.

Through the convalescent training program of the AAF, about 80% of combat casualties have been returned to duty. Since the program was started in November, 1942, 40,000,000 man-hours of physical and educational activities have been given in Army Air Force Hospitals.

The battery of 20 psychological tests given each aviation cadet candidate have not only proved valuable for selecting candidates and classifying them for training as bombardiers, navigators and pilots but for predicting success in combat, Gen. Grant reported. Men subsequently rated by squadron commanders as most successful in combat are those who rated on the upper end of the test scale. Those with the least acceptable scores tend to be the ones most frequently missing in action.

Selection of men for lead bombardier, which is the key job in a bombing mission, is now made on the basis of the psychological aptitude and proficiency tests which are given all bombardiers in the U. S. Army Air Forces in Western Europe.

The total cost of the psychological testing program is less than $5 per candidate, but the saving in time, money and lives, Gen. Grant said, cannot be estimated.

*Science News Letter, October 28, 1944*

AGRICULTURE

## Apple Juice Concentrate Keeps Fresh Cider Taste

➤ THE NATURAL taste of fresh cider will be available throughout the year in a new apple juice developed by the U. S. Department of Agriculture. The new product is a full-flavored apple juice concentrate which can be reconstituted, by the mere addition of water, to an apple juice which tastes and smells just like fresh apple cider.

It is made by heating fresh apple juice rapidly enough to avoid modifying its natural flavor, vaporizing the volatile flavoring constituents, and then collecting them as an essence from a single fractionating column. The juice from which the flavoring constituents have been stripped is concentrated by evaporation and the flavoring essence added to the concentrated juice. This gives a full-flavored, self-preserving apple juice concentrate.

*Science News Letter, October 28, 1944*

*Dehydrated butter* made in Australia for Allied troops in the tropics is approximately 15% lighter than ordinary butter but remains hard except in extreme climatic temperatures.

## Do You Know?

*Caraway seed* is now being grown in this country as a result of the war.

No *air-conditioned* railroad equipment is in use in Brazil on its 21,000 miles of railways.

The *mechanization* of agriculture is one of the prime objectives in Chile's new development program.

Because of its alkaline reaction and gaseous nature, *ammonia gas* was called "volatile alkali" by earlier chemists.

A new *electric gauge* is in use that will detect errors in thread gauges and threatened parts as small as twelve millionths of an inch.

Some colleges of pharmacy give prospective druggists courses in *cosmetics*, including their manufacture and action in use.

Fossil remains of a giant *flamingo*, larger than any flamingo ever known before, has been found in a quarry in South Dakota; the tropics and semi-tropics are the usual home of this bird.

Hungary has found the cultivation of *sunflower seed* for table oil to be more successful than the cultivation of other oil-producing plants and is constantly increasing the acreage.

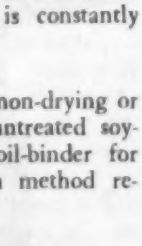
*Rosin* combined with a non-drying or slow-drying oil, such as untreated soybean oil, is used as a soil-binder for quick road building in a method recently patented.

NEW "PICK-UP" CANE

Permits Cripples and Invalids To Pick Up Small Articles Without Painful Stooping.

NO OTHER CANE LIKE IT

Now . . . in the MASON "PICK-UP" CANE we offer a double purpose, light weight cane specially designed for cripples and invalids. Concealed mechanism permits easy picking up of papers, pencils, cards, coins, etc., with simple finger pressure. No painful stooping necessary. Exceptional balance with rubber-tipped base insures safer walking. Beautifully finished. 5-DAYS TRIAL—Write for FREE Circular and 5-days' trial offer. Use the Mason "Pick-Up" Cane yourself or as a perfect gift for a friend.



W. H. MASON Box 27 Leesburg, Ohio

ACCOUNTING

# Ticket Printing Machine

**After the war, your railroad ticket will be printed while you wait. This will eliminate the need for large stocks of pre-printed tickets.**

➤ BUYING a railroad ticket after the war will be as fast and simple as buying a ticket to a movie theater today, thanks to a new machine that prints railroad tickets instantaneously, eliminating the necessity for maintaining a stock of tickets printed for various destinations on the same railroad.

The ticket printing machine is just one of five new inventions already perfected to make rail travel faster and cheaper, Edward H. Bunnell, vice-president of the Association of American Railroads reported.

The new machines are referred to by Mr. Bunnell as "new accounting controls of railroad revenues and costs." They are now being tried out by several railroads, and it is expected that they will be used widely as soon as the war is over, and materials for their manufacture are again available.

The machine for railroad ticket offices which prints card tickets as they are needed looks like a small cash register. It is primarily designed for local or point-to-point tickets, such as from Washington, D. C., to New York City or from St. Louis to Kansas City. Up to 100 different railroad stops can be printed by one machine. No provision has been made, as yet, for the indicating of intermediate stops on the ticket. Tickets good in coach or Pullman may be printed on the same machine.

The tickets themselves are approximately two inches square. At the same time that it prints the ticket, the machine does the serious bookkeeping for the railroad company. So complete is the bookkeeping job done by the machine that the ticket seller has no records to make up at the close of business for the company. The cost of printing 1,000 tickets, including paper, is less than 20 cents.

For longer tickets, such as those purchased for travel between New York and Los Angeles, where several railroads are involved, a second machine has been developed. Known as a ticket accounting machine, it uses long strip coupon tickets that have already been printed, and it prints in triplicate the amount of the fare, government tax, and the total amount of the ticket.

The third new device is a dining car register that will tabulate the details on meals in one-tenth the time required to do it now by hand, and will give the passenger a receipt for his meal.

The fourth device is a payroll machine that mechanically computes earnings and deductions, then prints them separately and as a total on the payroll check.

The fifth device combines the use of teletypewriters, like those used to transmit telegrams and news bulletins, and card-punching equipment. The combination makes it possible for the freight terminal at which the train is made up to make up a master punched card on each car in the train, containing information as to its contents, destination, instructions for handling perishables and so on. With the teletypewriter-card punch unit, the punched cards are reproduced instantaneously at any other terminal along the line through which the train will pass.

This information is duplicated by the machine on punched cards at the receiving terminal before the incoming train arrives, so that when the train chugs in, the yard forces are ready to handle it speedily.

*Science News Letter, October 28, 1944*

MILITARY SCIENCE

## Nazis Instruct Civilians In Use of Gas Mask

➤ GERMAN authorities recently instructed the citizens of Essen, industrial city not far from the West Wall, in the proper care of gas masks. New gas masks were distributed to different age groups, including babies.

These facts are reported (*Flight*, Sept. 14), the official organ of the Royal Aero Club. The instructions, published in an Essen newspaper, seem to indicate an increased interest in gas warfare on the part of the Nazis.

The instructions warned the people not to keep gas masks in damp places, since they may become clogged. They were told to keep them in a dry place, but not in storage closets containing anti-moth powder or moth balls.

*Science News Letter, October 28, 1944*

BOTANY

# NATURE RAMBLINGS

*by Frank Thone*

## Airborne Invasion

► PARATROOP tactics have been the means employed for seed dispersal by wild plants most successful in occupying London's bomb-blasted areas since the Nazi "hate" blitz early in the war. Airborne seeds have gone farthest and deployed most widely, Prof. E. J. Salisbury, University of London botanist, reported in an address before the Royal Institution of Great Britain.

By far the most abundant and most generally distributed of the "blitzweeds" is the big, lusty, red-flowered plant known in Britain as rosebay willowherb and in the United States and Canada as fireweed. Its thousands of seeds are carried on parachutes like thistledown, but rather more efficient. For one thing, the long hairs of the fireweed parachute open out widely in dry air, but when it becomes damp, in weather more suited for germination, they partly close, permitting an earthward glide.

Second honors were distributed among a number of species of the ragwort genus. The ragworts are botanical second cousins to the dandelion, and their seeds are carried more or less dandelion-fashion. This is less efficient than the fireweed's parachute; still, it suffices for quite general dispersal.

A number of other composite species, with parachute-borne seeds on the dandelion and thistle patterns, figure in the plant populations of bombed areas. Some of them are of American origin, notably the common fleabane, close cousin to the wild asters but less attractive to look at.

Some plants are able to travel by air even though not parachute-equipped, because their seeds or spores are so tiny and light that even faint breezes can carry them. Moss and fern spores are most successful at this kind of drifting, because of their microscopic size. However, very small seeds are also able to float like dust-grains in the air for at least moderate distances.

A third kind of seed travel that may have figured in the establishment of vegetation on bombed areas is accidental carriage on the clothing or shoes of human beings. This is by far the least efficient way for plants to get about in the world, to judge by results on the London bomb-scars.

Prof. Salisbury made a study of the floating power of seeds by dropping them through still air and holding a stopwatch on them while they fell ten feet. Fireweed seed averaged 43.4 seconds for the drop, the ragworts between five and eight seconds, and fleabane seeds 15.4 seconds. He pointed out that upward currents of air, such as occur on warm days, often reach these velocities, and can thus account for a major part of weed-seed transportation.

*Science News Letter, October 28, 1944*

EMPLOYMENT

## Blind Typist Is Employed In X-Ray Department

► A BLIND typist is employed in the X-ray department of one of the base hospitals of the Department of Health for Scotland, according to a report carried in the British Medical Journal. Her job is to transcribe the remarks of the radiologist as, in total darkness, he screens successive patients.

*Science News Letter, October 28, 1944*

**These people buy a battleship —every week!**

**Meet** John S.....and Mary D.....

**Between them, they put almost 30% of their pay into War Bonds—and have for 2 years.**

**John and Mary are typical of more than 27 million Americans on the Payroll Savings Plan who, every single month, put half a BILLION dollars into War Bonds. That's quite a chunk of money—enough to buy one of those hundred-million-dollar battleships every week, with enough money for an aircraft carrier and three or four cruisers left over.**

**In addition,** John and Mary and the other people on the Payroll Plan have been among the biggest buyers of *extra* Bonds in every War Loan Drive.

**When this war** is finally won, and we start giving credit where credit is due, don't forget John and Mary. After the fighting men, they deserve a place right at the top of the list. They've earned it.

**You've backed the attack—now speed the Victory!**

ENGINEERING

# Flaws Accurately Located

➤ AN AMERICAN pastime familiar before the days of movies and radio has been resurrected by science as the fundamental principle of a new method for detecting flaws in metal castings and blocks by stereoscopic X-ray pictures. Each stereoscopic picture is made up of two photographs taken from slightly different angles, so that when they are viewed through the two lenses of a stereoscope, they appear to have solidity and relief. They are commonly called three-dimensional pictures.

The stereoscopic method of exposing two separate films overcomes the decreased sensitivity inherent in double-exposure X-rays, where both pictures are made on one film, James Rigbey, radiologist of the Ford Motor Company of Canada, Windsor, Ontario, told the convention of the American Society for Metals in Cleveland. Sensitivity is improved by the stereoscopic method from 4% to 1%, while the maximum possible error in the actual measurements is calculated at about 14%, he stated.

In use, the new method consists of making two X-ray pictures of a specimen metal casting or block, using a slightly different position of the X-ray tube for each picture, so that the images of the specimens on the films are in relatively different positions, depending upon their relative distances above the film. Therefore the image of any flaw or defect in the specimen undergoes a shift on the second picture taken, relative to the first. The magnitude of the shift depends upon the shift of the X-ray tube, vertical position of the flaw in the specimen, and the focal distance, Mr. Rigbey explained.

Precise measurements can be made of the shift of the image to determine the vertical position of the defect by using a lead marker placed in exactly the same position relative to the specimen, usually attached to the specimen itself with cellulose tape, he stated.

A special graph has been developed to aid interpreters in their study and analysis of the stereoscopic pictures.

X-ray interpreters play an important role in modern industry. It is their responsibility to examine raw parts such as castings with X-ray equipment to see that they meet specific quality standards so that no unserviceable part, that might break down or fail when in use, gets into a finished product. The decisions made by the interpreter can also mean the difference between profit and loss for the producer of the raw parts.

Pointing out that the existing published standards for X-ray interpretation are very meager, Leslie W. Ball, assistant technical director of Triplett and Barton, Inc., Burbank, Calif., recommended to the meeting a system of identifying radiographic images with metallurgical defects and methods for determining the acceptability of defective parts. He also urged the more rapid development of professional status and recognition for X-ray interpreters.

*Science News Letter October 28, 1944*

**MATHEMATICS DICTIONARY**

**Second Printing, Second Edition**

**American Library Association's Subscription Books (encyclopedias, dictionaries, etc.) Committee says in Subscription Books Bulletin, Oct. 43: "In its subject field there is no work directly comparable to the Mathematics Dictionary. Because of its usefulness to anyone seriously interested in mathematics, the volume is recommended for personal, school or library purchase. For those already possessing the 1942 edition, purchase of the 1943 edition is suggested only if the dictionary is extensively used or a second copy is desired." Send $3.00 to Digest Press, Department 3B, Yan Nuys, California, or Science News Letter.**

CHEMISTRY

## Alkali-Chlorine Industry Active During Past 100 Years

➤ THE active 100-year history of the unheralded, though vitally important, caustic soda-chlorine industry in the United States was reviewed by L. D. Vorce, chemical engineer, of the Westvaco Chlorine Products Corporation, New York, at the meeting of the Electrochemical Society in Buffalo.

It was only 144 years ago that Cruickshank, a British scientist, discovered that electric current breaks up common salt into alkali and chlorine. This discovery laid the foundation for the electrolytic caustic soda-chlorine industry that in 1941 produced 677 tons of caustic by the process.

The first patent for an electrolytic process was issued in the United States in 1883, Mr. Vorce revealed. The process was never tried out, and many subsequent patents which were awarded on similar processes proved to be failures commercially. The first plant using the electrolytic process was built at Rumford Falls, Maine, in 1892, under the direction of Ernest A. LeSueur who started designing his process while still a student at the Massachusetts Institute of Technology. The LeSueur proces continues to operate successfully to this day, Mr. Vorce stated.

Since the first patent was issued, nearly 350 patents have been taken out on electrolytic caustic-chlorine processes. Of all these only about 32 have been tried out commercially, and only 16, less than 5%, have stood the test of time and continued to operate, Mr. Vorce remarked. He added that many of the cells might have succeeded if given a fair chance and with sufficient financial support.

Before the war, he declared, there were more than 40 electrolytic caustic-chlorine plants operating in this country. The demand for chlorine by the government for wartime use has resulted in seven additional plants being built.

*Science News Letter, October 28, 1944*

PHYSICS

## Better Television Foreseen As Result of New System

➤ BETTER television is promised in a system wherein the effect of increased sensitivity of an electronic scanning tube of the cathode ray type may be obtained, and on which patent 2,359,449 was awarded among the 453 patents of the week. The patentee is Robert E. Selby of Teaneck, N. J., and the patent has been assigned to the Radio Corporation of America.

In his television scanning system provision is made for ways and means by which the time period between scannings is lengthened out, thus increasing the effective sensitivity of any given area of mosaic electrode in the tube. A pair of image scanning tubes are used, each adapted to receive light images substantially alike, and also switching means for alternately rendering the independent scanning tubes and the associated preamplifiers operative and inoperative.

*Science News Letter, October 28, 1944*

A 614-gram *gold nugget* was recently found near Las Noches, Chile; a 500-gram nugget was found in the same locality a month earlier.

*Turkey* will be furnished overseas service men again this winter for Thanksgiving, Christmas and New Year's; a set-aside order already has been issued by the government to turkey raisers.

# • Books of the Week •

THE ADVANCEMENT OF SCIENCE, Vol. III, No. 9—*British Association for the Advancement of Science*, 95 p., paper, 5 shillings.

ANIMAL PATHOLOGY—Russell A. Runnells—*Collegiate Press*, 594 p., illus., $6.00, 3rd ed.

CLIPPER SHIP MEN — Alexander Laing — *Duell*, 279 p., illus., $3.00.

THE CONTROL OF GERMANY AND JAPAN—Harold G. Moulton and Louis Marlio—*Brookings*, 116 p., $2.

DOGS AT WAR—Clayton G. Going—*Macmillan*, 179 p. illus., $2.50.

DROUGHT IN THE UNITED STATES ANALYZED BY MEANS OF THE THEORY OF PROBABILITY—George Blumenstock, Jr.—*U. S. Dept. of Agric.*, illus., 15c.

ENGLISH-SPANISH COMPREHENSIVE TECHNICAL DICTIONARY—Lewis L. Sell, comp.—*McGraw*, 1477 p., $30.

GENERAL CHEMISTRY—John Arrend Timm—*McGraw*, 692 p., illus., $3.75.

GEORGE CARVER, BOY SCIENTIST—Augusta Stevenson—*Bobbs*, 202 p., illus., $1.50.

JOSEPH LISTER, FATHER OF MODERN SURGERY—Rhoda Truax—*Bobbs*, 287 p., illus., $3.50.

THE MICROSCOPE—R. M. Allen—*Van Nostrand*, 286 p., illus., $3.00.

NEUROLOGY OF THE EYE, EAR, NOSE, AND THROAT—E. A. Spiegel and I. Sommer—*Grune*, 267 p., illus., $7.50.

NORMAL LIVES FOR THE DISABLED—Edna Yost—*Macmillan*, 298 p., $2.50.

OUR ARMY AT WAR, THE STORY OF AMERICAN CAMPAIGNS IN WORLD WAR II TOLD IN OFFICIAL WAR DEPARTMENT PHOTOGRAPHS—*Harper*, $3.00. (An introduction by General George C. Marshall.)

PHYSICAL GROWTH AND DEVELOPMENT—Katherine Simmons—*National Research Council*, 87 p., paper, $1.25. (Monograph, vol. IX, no. 1.)

THE SMITHSONIAN INSTITUTION, ANNUAL REPORT OF THE BOARD OF REGENTS, 1943—*U. S. Gov. Print. Off.* 609 p., $2.00.

WE BUILD, WE FIGHT!—Hugh B. Cave—*Harper*, 222 p., illus., $2.50.

THE WOLVES OF MOUNT MCKINLEY—Adolph Murie—*Gov. Print. Off.*, 238 p., paper, 40c, National Parks of the United States, Fauna Series no. 5.

*Science News Letter, October 28, 1944*

MEDICINE

# Synthetic Riboflavin

➤ RIBOFLAVIN, one of the B vitamins, is synthesized by bacteria in the human intestinal tract, an experiment conducted in Baltimore by Drs. Victor A. Najjar, George A. Johns, George C. Medairy, Gertrude Fleischmann and L. Emmett Holt, Jr., disclosed.

Their findings cast doubt on the high and universal requirement for riboflavin that has previously been accepted, they state in reporting the experiment (*Journal, American Medical Association*, Oct. 7).

Twelve boys between ten and sixteen years old were the subjects of the experiment. They lived for 12 weeks on an experimental diet of purified vitamin-free foods. A vitamin mixture was given them separately, but it contained no riboflavin. The only riboflavin they got was a minute amount—between 70 and 90 micrograms daily—which occurred in casein that was supposed to be vitamin free.

Yet, despite this low intake of riboflavin, the body wastes were found to contain five to six times as much as was taken in the food—a fact that could be explained only by the production of riboflavin by the intestinal bacteria. Giving them succinylsulfathiazole, which checks the production of thiamin by intestinal bacteria, had practically no effect on the production of riboflavin.

During the three months of the experiment, the boys remained in excellent health except for one who developed a Vincent's stomatitis during the second week. This cleared up, however, without the boy's taking any riboflavin.

It has been known previously that riboflavin is manufactured in the intestines of rats and ruminant animals, but it had not been previously demonstrated that it occurs also in humans, he investigators state.

Further experiments are planned to determine whether it is necessary to take a small amount of riboflavin in order to start the manufacturing process in operation.

*Science News Letter, October 28, 1944*

NUTRITION

## Coffee, Tea and Beer Can All Contribute Vitamins

➤ COFFEE, tea, beer and beverages made from meat extracts can all contribute vitamins to the diet, it appears from studies that have been reported, (*Nutrition Reviews*, September).

Beer, studies made in England showed, supplies riboflavin and niacin, the latter the pellagra-preventing vitamin. Both are members of the vitamin B group.

A little over half a pint of one of the beers tested would furnish almost half the daily requirement of niacin and 15 to 30% of the riboflavin.

The malt that goes into the beer contains large amounts of both vitamins which means, it is pointed out, that malt products may be of importance as ingredients of bread and breakfast foods.

Whether they drink beer or not, the English get some riboflavin from their daily tea and Americans get some niacin from their daily coffee. Dr. W. H. Sebrell, of the U. S. Public Health Service, found that tea contains appreciable amounts of riboflavin. English scientists report figures showing that a cup of tea contains about 10 micrograms. This is one two-hundredth of the daily requirement of riboflavin.

Coffee, American scientists have reported, contains some niacin. The amount in the average cup of coffee as dispensed in various restaurants is about one milligram, which is one-hundredth of the minimum daily requirement.

Commercial meat extracts are rich in both riboflavin and niacin. A cup would provide on the average about one-tenth of the daily recommended ration of riboflavin and seven of the 10 milligrams generally set as the minimum daily requirement of niacin. The high niacin content, it is suggested, may have something to do with the reputation meat extracts have as stimulants.

*Science News Letter, October 28, 1944*

LANGUAGE IS POWER

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# •New Machines and Gadgets•

❁ *CIRCULAR MAPS of the two hemispheres mounted in a single frame may be rotated in unison by one thumbscrew so that points at equal distances north or south of the equator may be brought quickly into true relationships for study. Its use eliminates the distortions on ordinary flat maps.*

*Science News Letter, October 28, 1944*

❁ *LEASH HARNESS for Army or other dogs has a belt to pass around the soldier's or attendant's waist or over his shoulder. On it are one or more latches which open automatically to release the dog if the soldier or attendant falls to the ground.*

*Science News Letter, October 28, 1944*

❁ *NON-CRACKING motion picture screens, for temporary use inside or out of doors, are made of a durable and flexible light fabric. They can be folded or rolled into a small bundle without causing creasing or peeling. They are washable, resistant to fungus, and uninjured in all weathers by grease, oil or light.*

*Science News Letter, October 28, 1944*

❁ *WRIST-ATTACHED purse is held in place with two straps between which is a movable cross-piece to hold a wrist watch. The purse has a flat back with end extensions to which the straps are fastened.*

*Science News Letter, October 28, 1944*

❁ *"TAILWIND" is a new magnetic instrument which enables a bomber pilot*

*to determine, and so regulate, the power output of his engines accurately. It measures the minute twist in the shafts between engines and propellers, and through this the amount of driving force delivered. The picture shows a model, sensitive enough to measure the twist of a steel rod distorted by the hands.*

*Science News Letter, October 28, 1944*

❁ *COLLAPSIBLE combined desk, cabinet and table when closed occupies a desk-width space little wider than that required for a set of drawers. A side panel opens up to form a table held with two hinged legs; the top opens on hinges on the opposite side revealing compartments for writing materials.*

*Science News Letter, October 28, 1944*

❁ *LIGHTWEIGHT lifeboats, economical and easy to build in large numbers and requiring little metal, are constructed of plywood. Keel and frame are made of solid wood. The plywood shell is held by metal stem and stern posts.*

*Science News Letter, October 28, 1944*

❁ *ICE CREEPERS for shoe heels may be shifted quickly from under the heel to an inactive vertical position under the instep in front of the heel. The metal plate with its non-skid spurs is held firmly in position with a wide elastic band which can be stretched enough to permit the shifting.*

*Science News Letter, October 28, 1944*

*If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, 1719 N St., N. W., Washington 6, D. C., and ask for Gadget Bulletin 921.*


## Books

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**To Readers:**

Due to a work stoppage by printers, this issue is produced by offset, accounting for the differences you notice.